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Thunder Bay North Harbour Contaminated Sediment Management



October 2018



Canada - USA

Great Lakes Water Quality Agreement

Great Lakes
Water Quality
Agreement

Protocol Amending the Agreement Between Canada and the United States of America
on Great Lakes Water Quality, 1978, as Amended on October 16, 1983,
and on November 18, 1987
Signed September 7, 2012
Entered into force February 12, 2013



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What agencies are involved?

- Environment and Climate Change Canada (ECCC) and the Ontario Ministry of the Environment, Conservation and Parks (MECP) coordinate Canada's and Ontario's implementation of the Great Lakes Water Quality Agreement (GLWQA) through the Canada-Ontario Agreement Respecting the Great Lakes Ecosystem (COA).
- COA sets goals and objectives to restore and protect the Great Lakes water quality and ecosystem health, and it helps Canada meet its commitments under the GLWQA.
- Transport Canada (TC) owns the majority of the affected waterlot.
- Thunder Bay Port Authority (TBPA) has administration and control of the waterlot, under the Canada Marine Act.



Thunder Bay North Harbour (TBNH)



Historical operation of paper mill





Site Overview

- Contaminants of Concern: Total Organic Carbon, Mercury, Resin Acids, Copper
- Volume: ~390,000 cubic meters (over 150 Olympic-size swimming pools)
- Area: ~ 26 hectares (Ha) covered with enriched organic sediment (approx. 31.5 football fields)
- Up to ~4 metres of greyish, digested pulp deposit
- Sediment consists mainly of digested pulp, silt and clay
- Entrapped gas within the EOS



Timeline of Major Activities

Pre-2007	2007	2008	2009-2011	2012-2013	2014-2015
ECCC/MECP studies on sediment chemistry, sediment toxicity, mercury bioaccumulation potential, benthic community structure	Sediment Management Strategy: Management options Screening by EcoMetrix	Steering Committee Formed	Sediment Management Options (SMO) Assessment by AMEC	Risk Assessment by Franz Peer Review of SMO Assessment by Anchor Geotechnical Study by DST	SMO Assessment by Cole



Thunder Bay North Harbour Sediment Management Former Steering Committee



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TBNH Sediment Management History - 2008 Steering Committee

- Thunder Bay North Harbour (TBNH) Sediment Management Steering Committee (SC) was formed in Sept 2008 and consisted of representatives from ECCC, MECP, Abitibi and Cascades.
- SC was tasked to develop a remedial action plan for the impacted sediments in TBNH with input from stakeholders.
- SC was involved in making decisions on the appropriate scope, technique and cost of the overall cleanup while remaining engaged with all stakeholders.
- Thunder Bay Port Authority (TBPA) participated as an observer on the SC.



Current Status

- The 2013 risk assessment identified unacceptable risks to humans and biota.
- Enriched organic sediment (EOS) needs to be managed within the north harbour to meet the local industrial harbour total mercury level of 0.55 ppm.
- Approx. 26 hectares (about 31.5 football fields), including approx. 390,000 m³ (over 150 Olympic-size swimming pools), requires management action to reduce risk to an acceptable level.
- TBNH is considered a Class 1 – high priority for action under the Federal Contaminated Sites Program Aquatic Sites Classification System.
- Evaluation of sediment management options is on-going and will be the focus of the current working group.



The Need for Sediment Management Action



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Risk Assessment Results

- An Ecological and Human Health Risk assessment identified unacceptable risks:
 - Potential risk to kingfishers from mercury;
 - Potential risk to sediment dwelling organisms from total resin acids;
 - Potential risk to people consuming fish caught from the TBNH (fish consumption advisory in place to mitigate this risk); and
 - Potential risk to people coming in direct contact with contaminated sediment (industrial/construction workers/recreational users/subsistence fishers).



Site Classification

- TBNH was classified as a Class 1 site using the Federal Aquatic Sites Classification System by a consultant. Class 1 sites indicate high priority for action.
- The site was also reviewed and assessed by Federal expert review departments at the request of ECCC to verify the Class 1 designation. Federal expert departments scored the site as a Class 1 site.



Mill Ownership



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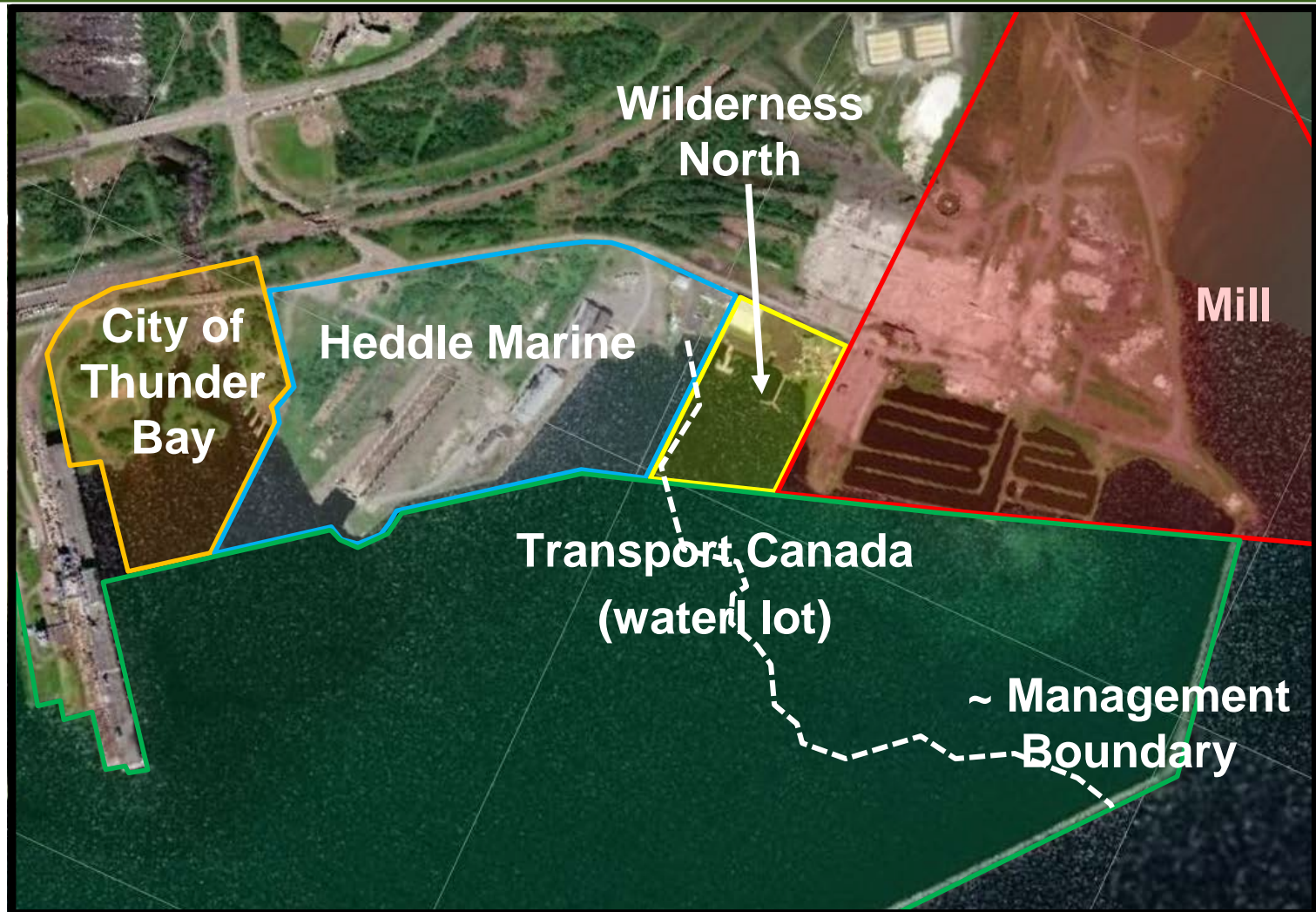
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Mill Ownership

Owner	Term	Comments
Abitibi Consolidated Inc.	1918-1993	Bankrupt as of 2009
Employees Group	1993-1997	
Cascades Fine Paper Group Inc.	1997-2007	
Thunder Bay Fine Papers	2007-2009	Operated the mill for 4 months; the mill closed in 2007.
Superior Fine Papers	2009-present	Did not operate the mill (mortgage held by Reliance Holdings Ltd)



Property Ownership (approx. boundaries)



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Sediment Management Options Assessment



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History of Sediment Management Options (SMOs) Assessment

1. EcoMetrix (2007) – hired by Cascade to screen sediment management options:
 1. Monitored Natural Attenuation
 2. *In-situ* remediation
 3. *In-situ* capping and
 4. Sediment removal by dredging and disposal in Confined Disposal Facility (CDF).
- Although the report identified capping and a CDF as high ranking options, it identified that data gaps needed to be filled before an option could be recommended.





History of Sediment Management Options (SMOs) Assessment

- 2. **AMEC (2009 to 2011)** – hired by Steering Committee and assessed the following SMOs using existing information:
 - 1. Monitored Natural Attenuation
 - 2. *In-situ* capping
 - 3. Dredging with disposal at an On-site Confined Disposal Facility
 - 4. Dredging with disposal at an Off-site Confined Disposal Facility (Mission Bay)
 - 5. Dredging with disposal at an upland disposal facility (landfill)
- The capping option was recommended for pilot testing.





History of Sediment Management Options (SMOs) Assessment

3. Cole Engineering (2014) – hired by Steering Committee and further examined the following SMOs using 2013 data. Input from Indigenous communities, public and local stakeholders was also included:

1. *In-situ* capping
2. Excavate and upland disposal (landfill)
3. Dredge and upland disposal (landfill)
4. A. Dredge and disposal at on site CDF
B. Dredge and disposal at existing lagoon and CDF
5. Dredge, cap and upland disposal
6. Dredge, cap and offsite disposal (Mission Bay CDF)
7. Dredge, cap and on-site CDF disposal



Results of Evaluation (Cole 2015 Final Report) – first 3 ranked options will be further evaluated.

Rank	SMO	Score
1	4A. Dredge and New On-Site CDF Disposal	0.686
2	4B. Dredge and Use Existing Lagoons as CDF Disposal	0.660
3	5. Dredge and Off-Site CDF Disposal (Mission Bay)	0.655
4	3. Dredge and Upland Disposal	0.571
5	2. Excavate and Upland Disposal	0.569
6	8 Dredge, Cap and On-Site CDF Disposal	0.566
7	1. Capping	0.535
8	7. Dredge, Cap and Off-Site CDF Disposal	0.531
9	6. Dredge, Cap and Upland Disposal	0.418



Working Group and Terms of Reference



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Working Group (WG) – Terms of Reference

- The Terms of Reference (ToR) provide an overview of the requirements and expected outcomes of the working group
- The ToR includes several appendices:
 - Appendix A – Communications Protocol
 - Appendix B – Fact Sheet and Frequently Asked Questions
 - Appendix C – Public Engagement Plan



Working Group (WG) – Terms of Reference

Objective is to provide a recommendation for a preferred option for the management of contaminated sediments in TBNH.

Principles and Approach:

- The WG will operate on the basis of consensus and collaboration.
- The members will represent their organization's interests as well as consider overall community benefit in recommending a preferred option.
- If consensus cannot be reached, each member of the working group will identify their concerns (if any) with each option and also identify their preferred option to the key federal and provincial government agencies (ECCC, TC, TBPA and MECP)



Working Group (WG) – Terms of Reference

Scope of Work: The WG will consider all previous and new information on Sediment Management Options (SMOs), represent each organization's interests in the deliberations, as well as consider community input in recommending a preferred SMO.

Participant Biographies: In the interest of transparency, each WG organization represented will complete a short biography which will be shared amongst WG members and appended to the TORs.



Discussion with Indigenous Groups

- Beyond the Working Group, the Crown agencies will outreach and engage with local First Nation and Métis communities regarding potential sediment management strategy options
- Feedback, perspectives and issues raised by Indigenous communities will be meaningfully considered and used to inform decision-making



Appendix A - Communications Protocol

- The **purpose** of this communications protocol is to ensure all parties have a common approach to any public communications and to share standard communications materials that will be used by lead Agencies in their own communications with external stakeholders and media.
- All media and public enquiries will be referred to ECCC and TC to allow for consistency and ease of quick communications.
ECCC, Media Enquiries
Telephone: 819-938-3338 Toll-free: 1-844-836-7799

TC, Media Enquiries
Telephone: 1-613-993-0055
- Technical reports and background information related to the TBNH can be obtained from the InfoSuperior website (<http://rap.infosuperior.com/northharbour/>)



Appendix B – Fact Sheet and FAQs

- A Fact Sheet and Frequently Asked Questions (FAQs) have been developed to support the Communications Protocol
- The Fact Sheet and FAQs are provided for reference purposes. All enquiries will be referred to ECCC and TC.



Appendix C - Public Engagement Strategy

1. **Public Meeting(s)** - Information session(s) will be held to present an overview of the SMO assessment.
 - a. **Presentation** – A PowerPoint presentation covering the SMO assessment will be developed. The presentation will be given at public meeting(s) and also will be uploaded to the InfoSuperior website.
2. **Website page** – Project information will be provided to the Thunder Bay RAP office for posting on www.InfoSuperior.com. Presentations on the following will be uploaded:
 - a. SMO assessment summary to date (work done to 2014 plus additional SMOs currently being assessed)
 - b. Recommended option by the working group
3. **Media Releases** – to be prepared in advance of public meetings



Further Evaluation of Previously Short Listed and New SMOs

Current Work (2018/2019)



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Current Work

- Additional sediment management options that have not been assessed are being considered along with the previous top 3 ranked options:
 - Berm the entire area and then fill it (Option 9)
 - Modify/Expand the mill's lagoon to contain all the dredged contaminated sediment (Option 4C)
- A contract will be issued to peer review Franz's Risk Assessment to confirm the findings.



SMOs Under Consideration

SMO	Previously Considered/New
4A. Dredge and New On-Site CDF Disposal	Previously Considered
4B. Dredge and Use Existing Lagoons as CDF Disposal	Previously Considered
4C. Modify / Expand Lagoons	New
5. Dredge and Off-Site CDF Disposal (Mission Bay)	Previously Considered
9. Berm with Fill	New



Previously Short-Listed SMO – On-site CDF without lagoon (4A) & On-site CDF with lagoon (4B)

- A new large Confined Disposal Facility (CDF), (Option 4A) would be constructed.
- To reduce the footprint of the new CDF, the existing adjacent lagoon would be utilized and a smaller CDF would be constructed (Option 4B).
- Enriched Organic Sediment (EOS) within the footprint of the new CDF would remain in place. EOS outside the new CDF would be dredged and placed in the new CDF/lagoon.
- After several years of consolidation, the new CDF would be capped. The new CDF could ultimately be used as commercial space, storage area, parking lot, parkland, recreational space for or marina uses.
- **Technical requirements:** geotechnical characterization of current lagoons.
- **Non-technical requirements:** identification of fill material sources, filling schedule and protocol, agreements on long term ownership, oversight and operation during filling, monitoring and maintenance, resolution of outstanding provincial obligations



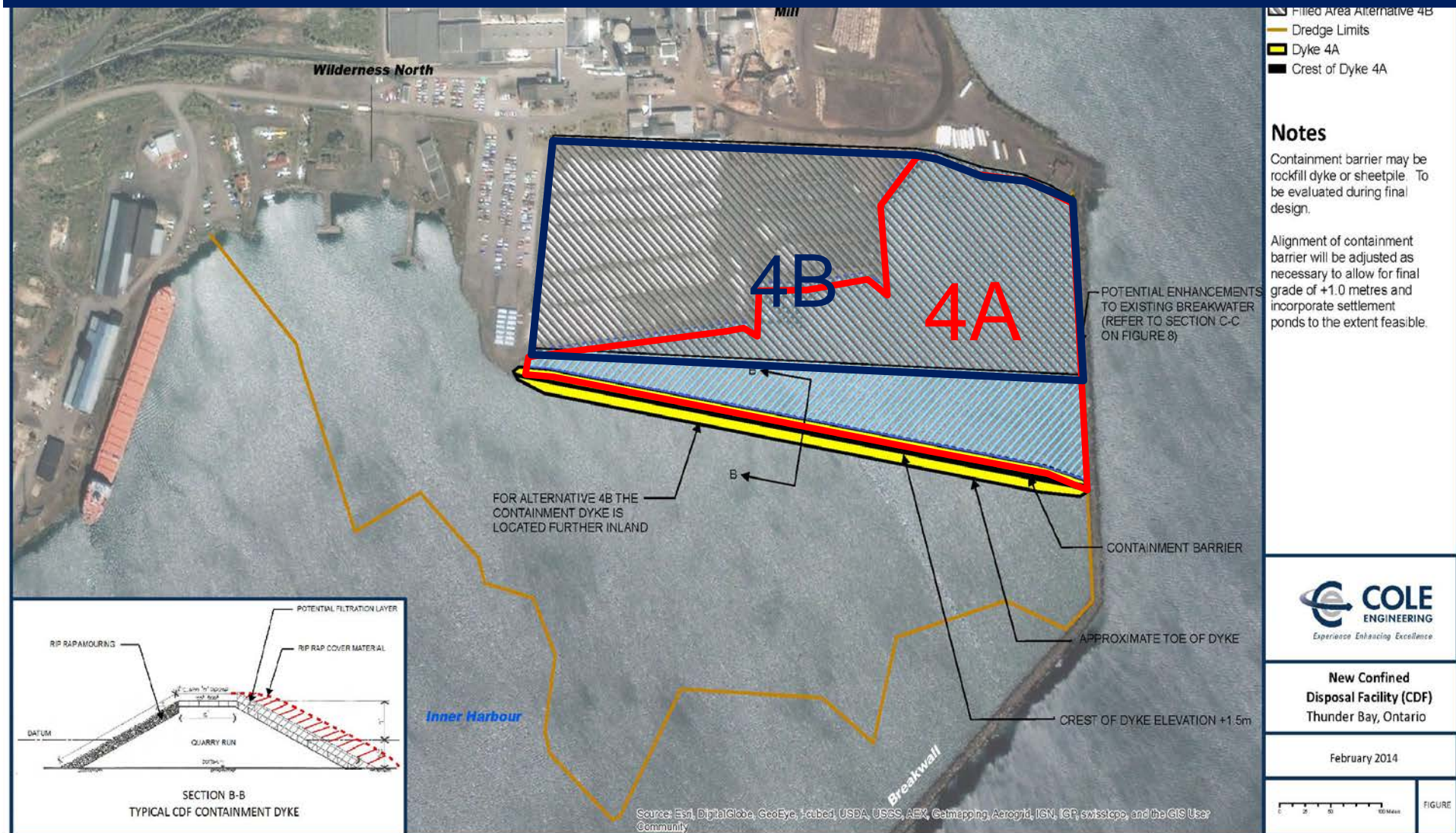
Previously Short-Listed SMO – On-site CDF without lagoon (4A)



Previously Short-Listed SMO – On-site CDF with lagoon (4B)



Previously Short-Listed SMOs – On-site CDF Options (4A and 4B)



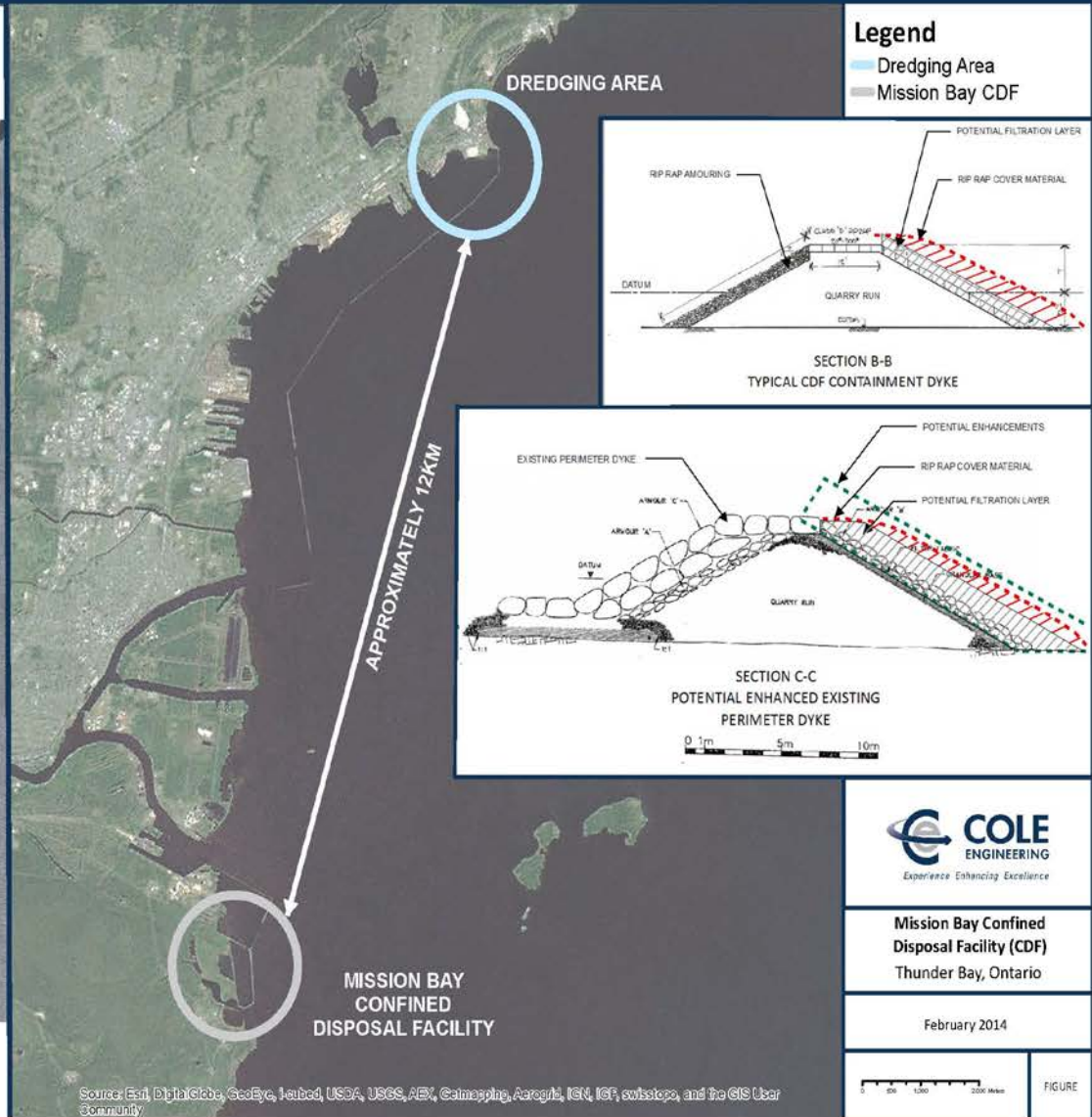
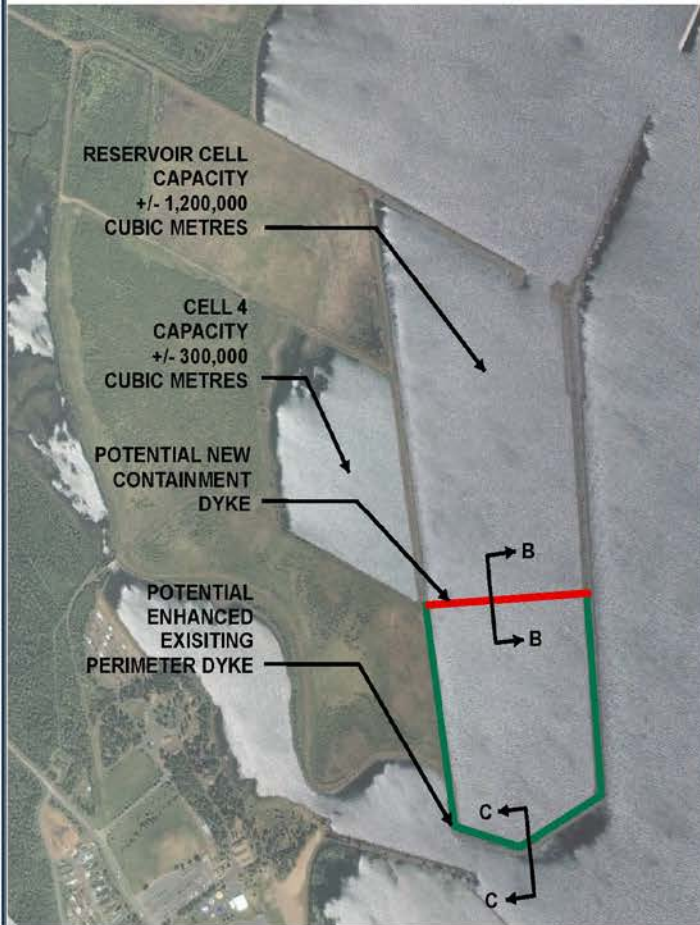
Previously Short-Listed SMO – Disposal at the Mission Bay CDF (5)

- Dredged Enriched Organic Sediment (EOS) would be placed in the existing Mission Bay Confined Disposal Facility (CDF), owned by the Port Authority.
- Enhancements to the existing CDF may be required to contain contaminants in the EOS.
- After several years of consolidation, the EOS would be capped.
- **Technical requirements:** geotechnical characterization and hydrogeological studies of existing CDF to support cell design.
- **Non-technical requirements:**
 - engagement of Fort William First Nation and Metis Nation of Ontario to determine community concerns related to this option
 - Confirm long term monitoring and maintenance responsibilities with TBPA



Disposal at the Mission Bay CDF (5)

Mission Bay Confined Disposal Facility



New SMO Consideration - Modify / Expand Lagoons (4C)

- A new Confined Disposal Facility (CDF), (Option 4C) would be constructed within the current lagoon footprint.
- Interior berms would be removed and the lagoon basin would be deepened as needed. Exterior walls and base of the lagoons would be modified to provide the required containment.
- Enriched Organic Sediment outside the new CDF would be dredged and placed in the new CDF.
- After several years of consolidation, the new CDF would be capped. The new CDF could ultimately be used as commercial space, storage area, parking lot, parkland, recreational space or marina uses.
- **Technical requirements:** geotechnical characterization of current lagoons and environmental characterization of any material excavated from the lagoons.
- **Non-technical requirements:**
 - Agreements on long term ownership, monitoring and maintenance
 - Resolution of outstanding provincial obligations.



Option 4C – Modify/Expand Lagoon



2018 Google Map



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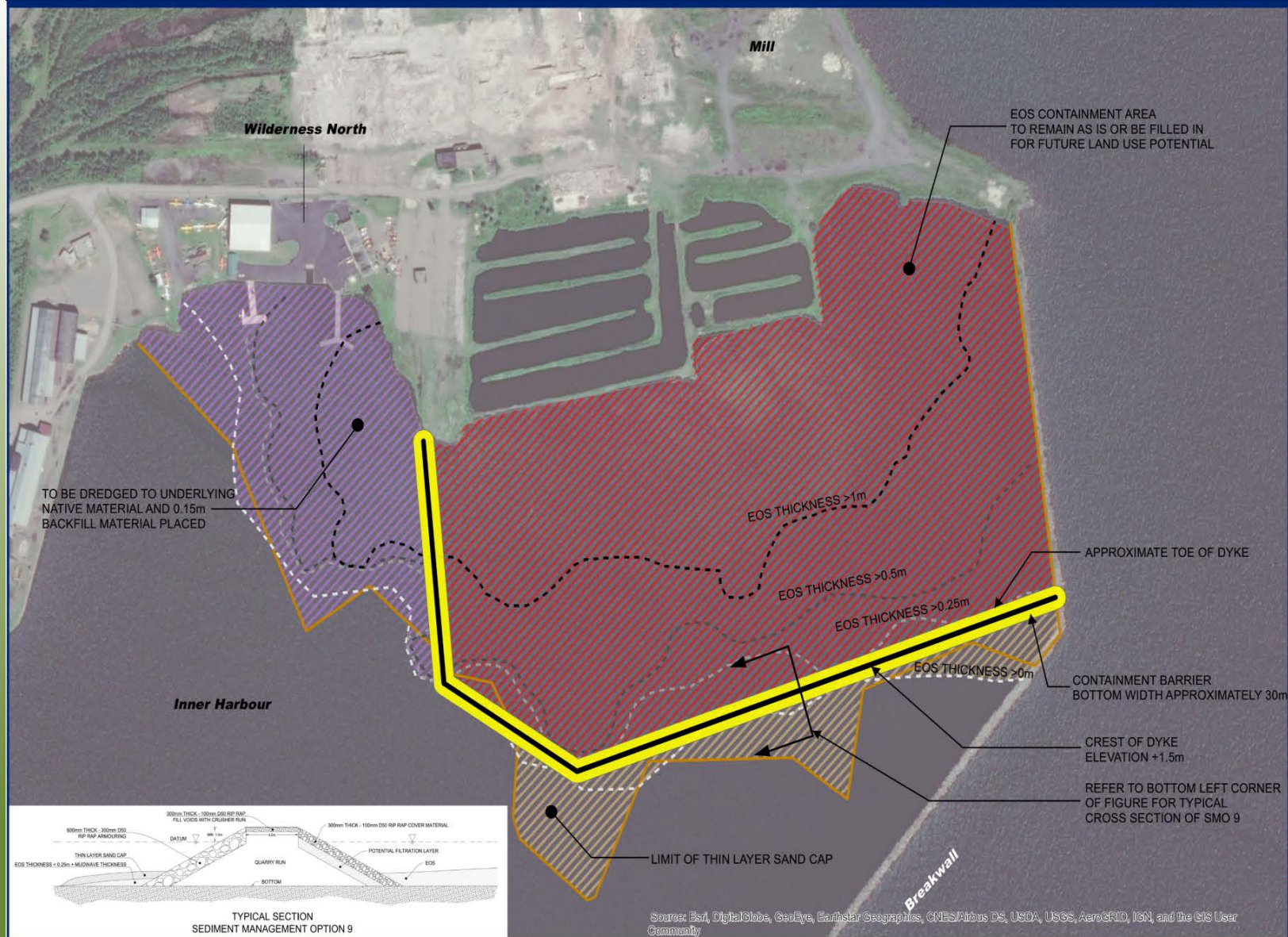
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New SMO Consideration - Berm with Fill (9)

- A new Confined Disposal Facility (CDF) berm would be constructed around the Enriched Organic Sediment (EOS) deposit with a thickness >0.25 m.
- EOS within the footprint of the new CDF would remain in place. EOS outside the new CDF would be dredged and placed in the new CDF.
- Fill material would be sourced and imported over time to cap the new CDF. The availability of the fill material is a data gap that needs to be filled. This option requires significantly more fill than other options being considered.
- After the capping and consolidation of the new CDF, it could ultimately be used as parkland, recreational space or for marina uses.
- **Technical requirements:** geotechnical characterization of new berm footprint and characterization of any candidate fill material.
- **Non-technical requirements:** identification of fill material sources, filling schedule and protocol, agreements on long term ownership, oversight and operation during filling, monitoring and maintenance.



New SMO Consideration – Option 9 – Berm with Fill

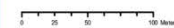


SMO 9

Thunder Bay, Ontario

June 2018

SCALE 1:3,500



FIGURE

9-3

Next Steps



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Next Steps

- Technical work required to fill data gaps for the options is to be scoped and contracted
- Discussions with Indigenous communities/organizations and public will be undertaken to assist in recommending an option
- The Working Group targeting a recommended option by the end of December 2019.
- The recommendation will be submitted to the key federal and provincial government agencies for consideration.



Questions



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